

User Exits

Natural ISPF provides a number of user exits written in Natural. The sources are delivered in the Exit Library. Before modifying any of these programs, you must copy them to one of your Natural libraries, as any subsequent INPL from the installation tape overwrites the Exit Library. Useful examples for user exits can be found in the Example Library.

After successful modification of an exit, you must copy the module to library SYSLIB, and activate the exit as described in the section System Configuration.

The various types of provided exits are described in the following subsections.

This section covers the following topics:

- Object Exits
 - PANVALET Save Exit ISPT-SVU
 - Logon Exit ISP-LONU
 - Logoff Exit ISP-LOFU
 - Print User Exit ISP-PRTU
 - Import/Export Exits
 - Color Settings Exit ISP-ECLU
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 - Session Exit ISP--S-U
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 - Incore Database Defaults Exit IDB-USRN
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Object Exits

A user exit is provided for each Natural ISPF object type (for example, PDS members, Natural objects, views, jobs, etc.).

Whenever a user issues a specified function command for a certain object, the corresponding user exit is called before the command is executed. A user exit can check whether the function, object type and parameters are valid for the user and can react in any of the following ways:

- Deny access to the function and return an error message;
- Return a warning message;
- Modify invalid function parameters;
- Allow access to the function.

Data Parameters

The data parameters you can define for object exits are the same for each object type:

Parameter	Format	Type	Meaning (<u>Member: TAB-FUNC</u>)					
#FUNCTION	(A2)	I	Contains a 2-character abbreviation of the function to be executed. Possible options:					
			--	ENTRY	FR	FORMAT		
			-2	Target of COPY	HL	HOLD		
			AL	ALLOCATE	IN	INFORMATION		
			BR	BROWSE	LS	LIST		
			CC	Condition codes	OT	OUTPUT		
			CH	CHANGE	PG	PURGE		
			CM	COMPRESS	PL	PLAY		
			CP	COPY source	PR	PRINT		
			CR	COMPARE	RL	RELEASE		
			CT	CATALOG	RN	RENAME		
			DF	DEFINITION	RU	RUN		
			DI	DIFFERENCE	SB	SUBMIT		
			DL	DELETE	ST	STATUS		
			DO	DOWNLOAD	UN	UNCATALOG		
			DS	DESCRIPTION	UP	UPLOAD		
			ED	EDIT	XE	EXECUTE		
			ET	EXTENTS	XT	EXTERNS		
			EX	EXPORT	ZP	ZAPS		
			FL	FOLLOW				
Note: Not all functions are valid for all object types. See the Natural ISPF User's Guide.								
#SES-DATA	(A253)	I/O	Contains object-specific parameters; you must redefine these according to the object type. A parameter data area is delivered in source form for this redefinition.					
#ERROR-CODE	(N3)	O	Function will be denied if an error code greater than 0 (zero) is received.					
#ERROR-NR	(N4)	O	Error number for SYSERR, the errors greater than 9000 in the System Profile Library are not used by Software AG and you can therefore define them (currently, 9001 and 9002 are used for example exit ISPN---U, but these can be overwritten). If this field is set and ERROR-CODE is zero, the message will be displayed as a warning, unless more important messages (like FOLLOW) have to be displayed.					
#ERROR-PARM	(A75)	O	Parameters for the error message can be passed to the Natural ISPF error handler, multiple parameters must be separated by a semicolon (;). They replace :1:, :2:, :3: etc. parameters in the error text.					

#OPTIONS	(A20)	I/O	<p>Global data which can be shared by all user exits and by all Open NSPF subprograms.</p> <p>Can also be used to transfer control to another object (also an Open NSPF object). This is useful if a user-written routine handles functions for existing objects. The syntax is: 'OBJECT = xx' where: xx is the object code as defined in the CONTROLS table. The field is cleared by Natural ISPF when transferring control to the new object.</p> <p>Example: MOVE 'OBJECT = -7' TO #OPTIONS</p>
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Table of Exits and Object Abbreviations

This table lists all object-related user exits provided, as well as the data areas used by them, and an abbreviation of the object valid for the OBJECT parameter.

The data areas are also delivered in source form, the fields used have meaningful names and are documented in the data area source itself.

Exit Name	Data Area	Object (Member: TAB-EXIT)	Object Abbreviation
ISBD---U	ISBD---L	BS2000/OSD files	BF
ISBJ---U	ISBJ---L	BS2000/OSD jobs	BJ
ISBL---U	ISBL---L	LMS elements	LMS
ISBV---U	ISBV---L	BS2000/OSD job variables	JV
ISB6---U	ISBL---L	LMS element versions	LMV
ISDA---U	ISDA---L	VSE/ESA active jobs	DA
ISDD---U	ISDD---L	VSE/ESA files	FIL
ISDJ---U	ISDJ---L	VSE/ESA jobs	DJ
ISDL---U	ISDP---L	VSE/ESA sub-libraries	SUB
ISDP---U	ISDP---L	VSE/ESA members	MEM
ISDR---U	ISDR---L	VSE/ESA member versions	VV
ISDZ---U	ISDP---L	VSE/ESA volumes	DV
ISIC---U	ISIC---L	Incore container files	CTN
ISPA---U	ISPA---L	OS/390 active jobs	A
ISPB---U	ISPB---L	Buffer Pool files	BPF
ISPC---U	ISPC---L	Console	CON
ISPD---U	ISPD---L	OS/390 data sets	D
ISPE---U	ISPE---L	Recovery files	R
ISPF---U	ISPN---L	ISPF configuration	F
ISPG---U	ISPJ---L	Syslog	LOG
ISPJ---U	ISPJ---L	OS/390 Jobs	J
ISPK---U	ISPP---L	CSECT	CST

ISPL---U	ISPL---L	LIBRARIAN	LIB
ISPM---U	ISPM---L	ISPF Menus	MNU
ISPN---U	ISPN---L	Natural	N
ISPO---U	ISPO---L	Output (workpool entries)	O
ISPP---U	ISPP---L	PDS members	P
ISPR---U	ISPR---L	PDS member versions	PV
ISPS---U	ISPJ---L	OS/390 SYSOUT files	S
ISPT---U	ISPT---L	PANVALET	PAN
ISPU---U	ISPU---L	ISPF users	U
ISPV---U	ISPV---L	Views	V
ISPX---U	ISPN---L	Macro	MAC
ISPY---U	ISPY---L	Natural errors	E
ISPZ---U	ISPP---L	OS/390 volumes	VOL
ISP1---U	ISP1---L	Member versions	MV
ISP2---U	ISP2---L	Natural versions	NV
ISP4---U	ISPE---L	Buffer Pool Recovery files	BPR
ISP5---U	ISPL---L	LIBRARIAN versions	LV

Examples of Object Exits

Example 1: Exit for Natural

The following program is invoked when a user issues an EDIT command for a Natural object. It restricts write access to objects in Natural library NSPFWORK to users JWO, GW1 and MBE. The program warns these specified users to be careful, and unauthorized users are presented with an error message.

```

* JOB USER EXIT
*
* List JOB queue without selection criteria is not allowed.
* exit modifies the selection criteria and puts first 3 characters of
* user-id into it.
*
DEFINE DATA PARAMETER
1 #FUNCTION(A2)
PARAMETER USING ISPJ---L
PARAMETER
1 #ERROR-CODE(N3)
1 #ERROR-NR   (N4)
1 #ERROR-PARM(A75)
1 #OPTIONS    (A20)
LOCAL
1 #A3         (A3)
END-DEFINE
*
DECIDE ON FIRST VALUE OF #FUNCTION
VALUE 'LS'
    IF #JOBNAME   = ' ' OR = '*'
        MOVE *USER TO #A3
        COMPRESS #A3 '*' INTO #JOBNAME LEAVING NO
    END-IF
    NONE IGNORE
END-DECIDE
END

```

Example 2: Exit for JOBS

This exit is invoked when a user issues the LIST command on object type JOBS. It does not allow a list request without selection criteria and writes the first three characters of the user ID to the job name parameter:

```

* JOB USER EXIT
*
* List JOB queue without selection criteria is not allowed.
* exit modifies the selection criteria and puts first 3 characters of
* user-id into it.
*
DEFINE DATA PARAMETER
1 #FUNCTION(A2)
PARAMETER USING ISPJ---L
PARAMETER
1 #ERROR-CODE(N3)
1 #ERROR-NR   (N4)
1 #ERROR-PARM(A75)
1 #OPTIONS    (A20)
LOCAL
1 #A3         (A3)
END-DEFINE
*
DECIDE ON FIRST VALUE OF #FUNCTION
VALUE 'LS'
    IF #JOBNAME   = ' ' OR = '*'
        MOVE *USER TO #A3
        COMPRESS #A3 '*' INTO #JOBNAME LEAVING NO
    END-IF
    NONE IGNORE
END-DECIDE
END

```

PANVALET Save Exit ISPT-SVU

This exit is called after each successful save of a PANVALET member. The exit must be activated by the definitions in the PANDEF member (see the Section System Configuration).

An example program is delivered in the User Exit Library. It illustrates how to access the output from PAM#1 and displays the output on the screen.

The following table lists all definable parameters:

Parameter	Format	Type	Meaning
P1	(A250)	I/O	Exit control block has to be redefined with the following definitions.
FILLER-1	(A12)		
EX-RNUM	(B4)	I	Number of records (saved).
EX-RLEN	(B2)	I	Record length.
FILLER-2	(A2)		
EX-ECODE	(B2)	O	Error code.
FILLER-3	(A10)		
EX-ETEXT	(A64)	O	Error text.
FILLER-4	(A4)		
EX-DSNAME	(A44)	I	PANVALET dataset name.
FILLER-5	(A10)		
EX-MEMBER	(A10)	I	PANVALET member name.
EX-VOLSER	(A6)	I	Volume serial number.
EX-PASSWD	(A8)	I	Password.
FILLER-6	(A1)		
EX-NODE	(B1)	I	Entire System Server node.

Logon Exit ISP-LONU

This exit is called when the user logs on to Natural ISPF. It is executed after standard logon handling, and can be used to issue a command to Natural ISPF directly at logon. Any valid Natural ISPF command is possible; for example, this could be a PLAY command.

In addition to the standard data parameters described above, you must define the following data in the exit:

Parameter	Format	Type	Meaning
#USER	(A8)	I	User ID of the user for whom the exit is to be executed.
#COMMAND	(A50)	I/O	Natural ISPF command sequence to be executed at logon.

Logoff Exit ISP-LOFU

This exit is called when the user logs off from Natural ISPF. It is executed after standard logoff handling, and can be used to issue a command to Natural directly at logoff. Any valid Natural command is possible.

In addition to the standard data parameters described above, you must define the following data in the exit:

Parameter	Format	Type	Meaning
#USER	(A8)	I	User ID of the user for whom the exit is to be executed.
#COMMAND	(A50)	I/O	Natural command to be executed at logoff.

Example:

The following example logoff exit issues the FIN (FINISH) command to Natural after user JWO logs off from Natural ISPF: the user is returned to the TP environment directly, bypassing Natural.

```
* LOGOFF USER EXIT
*
* SKIP NATURAL AT LOGOFF
* DEFINE DATA PARAMETER
1 #USER(A8)
1 #COMMAND(A50)
1 #ERROR-CODE(N3)
1 #ERROR-NR (N4)
1 #OPTIONS(A20)
END-DEFINE
*
IF #USER EQ 'JWO'
  MOVE 'FIN' TO #COMMAND
END-IF
*
END
```

Print User Exit ISP-PRTU

When this exit is activated in the Natural ISPF configuration member by entering (PRINT, it is called twice whenever a user invokes the Natural ISPF print function.

The exit is invoked before the printer is opened, with FC=O. The following actions can be performed:

- DEFINE printer (for Printer 2): under Natural 2.2, a printer can be opened with the PROFILE parameter to activate specific profiles; #FC must be RESET in this case, no define printer will be executed by the caller;
- Abort print function by returning an error-code, error number and parameters.
- Modify printer and number of lines per page;
- Return an escape sequence to be printed as first line of the printout;
- Define whether the escape sequence has to be printed on printer CCONTROL;

The exit is also invoked before the printer is closed, with FC=C. The following action can be performed:

- DEFINE/CLOSE printer for Printer (2). #FC must be RESET in this case, no close printer will be executed by the caller;
- Return an escape sequence to be printed as last line of the printout;
- Define whether the escape sequence has to be printed on Printer CCONTROL.

The following is an example of a customized user print exit: **ISP-PRTU, Lib.NSPFEXAM**

```

* *****RESET-#FC***** ** *****/*open+done*****
DEFINE-PRINT-#PARAMETER /* close call
* *****DEFINE-PRINTER(2)*@OUTPUT-#MYPRINT-#**valid-for-nat21*****
1 #FC RESET #FC) /* I/O Function-Close/Open,C=Close
  NONE IGNORE /* when reset to ' '
END-DECIDE /* no Open/Close will be done by caller
1 #PRINTEROUTID /* I/O Printer id
END-OBJECT (A2) /* I Object type to be printed
f #SES-DATA (A200) /* I Session data for object
f #RECLN (N4) /* I Length of records to be printed
f #CONTROL-#1 gets landscape mode for printer, if
* the records to be printed contain more than 80 bytes.
* /*
  1 = yes
IF #PRINTER EQ 'DAEPR14' OR 2 = yes #PRINTER-#1 Handle MCC
  #PRINTER EQ SCAN /TEMP' (machine code control chars) for future use
1 #PRINTER-#1 FAST VALUE OF #FCPrinter profile for future use
1 #ESC-SEQ 'O(A80) /* O Esc-sequen to be printed:
  SET WINDOW 'WIND1' #FC='O' before the first line
  INPUT 'Mark for Landscape' #LANDS-#1 the last line
1 #NO-MONSTRN) TO #REFRESH-SCREEN# lines per page
1 #REFRESH-SCREEN(L) /* O True if screen has to be refreshed
  MOVE #LANDS TO #WORK Must be set if this exit does any
  IF #LANDS NE ' /* terminal I-O
1 #ERR-MOVEOD#STAN) TO #ESC-SEQAS USUAL* set landscape mode
1 #ERR-#1 (A75) /* O AS USUAL* if executing under NAT22
1 #ERR-#1 (A75) /* O AS USUAL* if executing under NAT22
1 #OPTIO#V#2) TO #CONTROB FFU /* print on CCONTROL
1 #WORDND-#A20) /* I/O Internal work area
LOCAL END-IF
1 #SYAVE#6' /* close call
2 #MOVEA#WORENT) #LANDS1,132;99,999&'>
2 #SIF #LANDSINT' <'!R! SPO L; FONT 23; SCPI 14; SLPI 9; EXIT;'>
1 REDEFNE #PRNT-SEQ #ESC-SEQ /* set mode back
2 #PRNTIF(A80)
1 #NONEIGNORE
END-DECIDE7) INIT <'&%21,80;99,999&'>
END-#E-P (A63) INIT
END <' !R! SPO P; FONT 8; SCPI 12; SLPI 6; UNIT I; SLM 1; EXIT;'>
1 REDEFINE #END-SEQ
2 #END (A80)
1 #LANDS (A1)
END-DEFINE
*
DEFINE WINDOW WIND1 SIZE 04 * 30
  BASE 04/25
  CONTROL WINDOW
  FRAMED ON
*
*
IF #PRINTER = 'EDITOR' OR = 'WORKPOOL'
  OR #RECLN LE 80
  ESCAPE ROUTINE
END-IF
*
*
* If the printer is called 'EXIT' then Open/Close is done
* by this routine (and not by ISPF)
*
IF #PRINTER EQ 'EXIT'
  DECIDE ON FIRST VALUE OF #FC
  VALUE 'O' /* open call
  DEFINE PRINTER (2) OUTPUT 'MYPRINT'

```

Import/Export Exits

Natural ISPF provides exits that are required when you wish to change the default workfile number for the IMPORT/EXPORT PC function. The default workfile number is 7. These routines contain all READ/WRITE operations. You can adapt the source to enforce use of another workfile.

After each source change, you must recompile the programs and copy them to the SYSLIB library. Note especially, that if you change one program, you must change them all accordingly.

The import/export exits are:

ISP-SEPU
ISP-SE2U
ISP-SE3U
ISP-SE4U
ISP-SIMU
ISP-UPBU
ISP-DLBU
ISP-SECU

Color Settings Exit ISP-ECLU

This exit is always called whenever Natural ISPF is invoked or suspended. It can be used to modify Natural color settings when leaving or entering Natural ISPF.

The following parameters are passed to the exit:

Parameter	Format	Type	Meaning
#FC	(A1)	I	I = when entering Natural ISPF. Any other value = when suspending Natural ISPF.
#USER-ID	(A8)	I	User ID of the user for whom the exit is to be executed.

Resume Exit ISP-RESU

This program can be invoked when returning to Natural ISPF after execution of the command Natural or APPLICATION. This program can be used to display messages to the user.

To invoke this resume exit, you must enter (RESUME in the CONFIG member.

In addition to the standard data parameters described above, you must define the following data in the exit:

Parameter	Format	Type	Meaning
#USER	(A8)	I	User ID of the user for whom the exit is to be executed.
#COMMAND	(A50)	I/O	Command to be executed.

Example:

The following example program checks for new messages in the user's Inbasket in Con-nect, Software AG's Office system:

```

* USER EXIT TO BE INVOKED WHEN resuming NSPF
* ***** ** *****
DEFINE DATA PARAMETER
* ***** ** *****
1 #USER(A8)          /* I
1 #COMMAND(A50)      /* I/O  command to be executed
1 #ERROR-CODE(N3)    /* O      GT ZERO  command will not be executed
1 #ERROR-NUMBER(N4)  /* O      AS USUAL
1 #ERROR-PARM(A75)
1 #OPTIONS(A20)      /* I/O    FFU
LOCAL
*
* example to check con-nect inbasket items
*
1 #RETURN-CODE (N2)
1 #CABINET      (A8)
1 #PASSWORD     (A8)
1 #NEW-PHONE    (P8)
1 #NEW-MAIL     (P8)
1 #NEW-INVIT    (P8)
1 #OPEN-MAIL    (P8)
1 #POST-MAIL    (P8)
1 #MAIL-SUM     (P8)
1 #MARK         (A1)
END-DEFINE
*
DEFINE WINDOW WIND1 SIZE 06 * 30
  BASE 09/25
  CONTROL WINDOW
  FRAMED ON
SET WINDOW 'WIND1'
SET CONTROL 'Y45'
INPUT (AD=IM) 'Mark for mail check: ' #MARK
IF #MARK NE ' '
  MOVE #USER TO #CABINET
  CALLNAT 'Z-INBKT'
  #RETURN-CODE #CABINET #PASSWORD
  #NEW-PHONE #NEW-MAIL #NEW-INVIT
  #OPEN-MAIL #POST-MAIL
  IF #RETURN-CODE EQ 0
    COMPUTE #MAIL-SUM = #NEW-PHONE + #NEW-MAIL + #NEW-INVIT
    IF #MAIL-SUM GT 0
      MOVE #MAIL-SUM TO #ERROR-PARM
      MOVE 9004 TO #ERROR-NUMBER
    END-IF
  END-IF
END-IF
*
END

```

Suspend Exit ISP-SUSU

This program can be invoked when suspending Natural ISPF before execution of the command Natural or APPLICATION. For example, the program can be used to prohibit execution of these commands by setting an error code.

To invoke this suspend exit, you must enter (SUSP in the CONFIG member.

In addition to the standard data parameters described above, you must define the following data in the exit:

Parameter	Format	Type	Meaning
#USER	(A8)	I	User ID of the user for whom the exit is to be executed.
#COMMAND	(A50)	I	Command to be executed (APPLICATION/ NATURAL).
#PARM	(A78)	I	Parameters to be passed with the command.

Example of data parameters:

```
* User exit to be invoked when ISPF is suspended
* .i.e before the commands NAT or APPL are executed
* ***** ** *****
DEFINE DATA PARAMETER
* ***** ** *****
1 #USER(A8)          /* I
1 #COMMAND(A50)      /* I
1 #PARM (A78)        /* I
1 #ERROR-CODE(N3)    /* O      GT ZERO  command will not be executed
1 #ERROR-NUMBER(N4)  /* O      AS USUAL
1 #ERROR-PARM(A75)
1 #OPTIONS(A20)      /* I/O      FFU
END-DEFINE
*
IF *USER EQ 'JWO'
  IF #COMMAND EQ SCAN 'HUGO' OR
    #PARM EQ SCAN 'HUGO'
    MOVE 1 TO #ERROR-CODE      /* not allowed
    MOVE 9001 TO #ERROR-NUMBER
  END-IF
END-IF
*
END
```

Session Exit ISP--S-U

The session exit is invoked when a SUBMIT command has been entered in an edit or browse session. This exit can be used to disallow the submit function.

To invoke this exit, you must enter (SESS in the CONFIG member. For using this exit in the context of EXPORT operations, see the description of APPLYMOD 91.

In addition to the standard data parameters described above, you must define the following data in the exit:

Parameter	Format	Type	Meaning
#OBJECT	(A2)	I	Identifies the object type to be submitted (for example, P for PDS member). For a list of possible values, see the Table of Exits and Object Abbreviations.
#SES-DATA	(A200)	I	Parameters for this object. The session data is used differently for every object type. The correct redefinitions can be found in the data areas for the object, see also the Table of Exits and Object Abbreviations.
#OPTIONS	(A20)	O	Current SAG Editor session number in format 'SES=n' or 'SES=nn' where 'n' is a one-digit and 'nn' a two-digit session number.

Example of data parameters:

```

* Session user EXIT
*
DEFINE DATA PARAMETER
1 #OBJECT (A2)
1 #SES-DATA(A200)
1 #FUNCTION-DATA(A64)
1 #FUNCTION(A2)
1 #ERROR-CODE(N3)
1 #ERROR-NR (N4)
1 #ERROR-PARM(A75)
1 #OPTIONS (A20) /* I/O for future use

```

Rename Function Exit ISP-RN-U

The rename exit is invoked when a RENAME command has been entered. The exit is invoked by the new name and can check whether the new name is valid.

To invoke this rename exit, you must enter (RENAME in the CONFIG member.

In addition to the standard data parameters described above, you must define the following data in the exit:

Parameter	Format	Type	Meaning
#OBJECT	(A2)	I	Identifies the object type to be renamed (for example, P for PDS member). For a list of possible values, see the Table of Exits and Object Abbreviations.
#SES-DATA	(A200)	I	Parameters for this object. The session data is used differently for every object type. The correct redefinitions can be found in the data areas for the object, see also the Table of Exits and Object Abbreviations.
#FUNCTION-DATA	(A64)	I	Contains the function parameters, in this case the new name of the object to be renamed.

Example:

The following little example program reports new name ANTON as invalid.

```

* RENAME function user exit
*
  DEFINE DATA PARAMETER
  1 #OBJECT (A2)
  1 #SES-DATA(A200)
  1 #FUNCTION-DATA(A64)
  1 #ERROR-CODE(N3)
  1 #ERROR-NR (N4)
  1 #ERROR-PARM(A75)
  1 #OPTIONS (A20) /* I/O for future use
  LOCAL USING ISP-RN-L
  LOCAL
  END-DEFINE
  MOVE #FUNCTION-DATA TO #FUNC-DATA-RN
  SET CONTROL 'WB'
  DISPLAY #OBJECT #NEWNAME
  IF #NEWNAME EQ 'ANTON'
    MOVE 1 TO #ERROR-CODE
    MOVE 6800 TO #ERROR-NR
  END-IF
*
END

```

User Library Exit ISP-PRFU

User-specific data such as profiles and menus is stored in the User Profile Library, which is called SYSISPFU and resides on the FNAT system file.

With this exit, the names of all user-specific libraries can be changed. If the modified library name does not start with SYS, the data will be stored and subsequently read from the FUSER system file. This exit is always invoked when a user library is accessed.

If you want to change the library name, modify the program accordingly, compile it and copy it to SYSLIB to activate it.

Parameter	Format	Type	Meaning
#LIBRARY	(A8)	I/O	The name of the library. SYSxxx libraries are read from FNAT, others from FUSER.
#TYPE	(A1)	I	Library type. Possible values:
			' ' Profile library. Default: SYSISPFU
			'H' Help text library. Default: SYSISPHU
			'N' News text library (usually identical with the help text library). Default: SYSISPHU
			'U' Uinfo library. Default: SYSISPIU

This subroutine can be modified by the user. It can be used to modify the Natural library names, where site-specific Natural ISPF data is stored.

If the standard library names (on the FNAT system file) are acceptable, do not modify this program.

User Group Exit ISP-UGRU

When activated, this exit receives control each time a profile item is to be located within the User Profile Library.

With this exit, the sequence of user names or group names to be checked for existing profile definitions can be modified before accessing the database to search for them. In particular, the exit can erase some of the array entries from the array of group names passed to the exit, thus reducing the number of database calls required to locate a profile definition.

To make use of this option, modify the program accordingly, compile it and copy it to SYSLIB. To activate the user group exit, you must enter (GROUPS in the CONFIG member. In addition to the standard data parameters described above, you must define the following data in the exit:

Parameter	Format	Type	Explanation
#S-OPTION	(A1)	I	Search option in use: Contains T if APPLYMOD 101 is set to S. Contains Q if " " is set to P. Contains D in all other cases.
#USER-ID	(A8)	I	User ID of current session or of the user being edited (if invoked in the context of user maintenance).
#PROFCHAIN	(A253)	I/O	To be redefined with the following array:
#CHAIN-GROUPID	(A8/1:23)		Array of user IDs, group IDs or prefixes to be searched for. This array will be filled by Natural ISPF before calling the exit, in the manner specified by APPLYMOD 101.

Example:


```

*****
* OBJECT : ISP-UGRU   DATE CREATED: 27.10.97       BY: MZC
* -----
* PURPOSE:
* SAGSIS P166675
*   MODIFY SEQUENCE OF GROUP PROFILES TO BE SEARCHED FOR;
*   (E.G. to reduce number of ADABAS calls during group profile search)
* -----
* PROGRAM HISTORY
* DATE      USER-ID  REF-NO   DESCRIPTION
*****

*
* DEFINE DATA
* PARAMETER
1 #S-OPTION              (A1)    /* IN : search option derived
*                               /* from APPLYMOD / global flag
*                               = C: compatibility mode:
*                               use old prefix logic
*                               = D: like C, but invoke user exit
*                               = S: search all NSC groups
*                               (first privileged, then others)
*                               = T: like S, but invoke user exit
*                               = P: search privileged NSC groups
*                               only
*                               = Q: like P, but invoke user exit
*                               ISP-UGRU after building chain
1 #USER-ID               (A8)    /* IN : User-Id (from GDA)
1 #PROFCHAIN             (A253) /* OUT: chain of profiles to be searched
1 REDEFINE #PROFCHAIN
  2 CHAIN-GROUPID        (A8/1:23) /* WARNING: you are advised NOT to
*                               /* extend the length of this array !
*                               /* NOTE: adding array entries will
*                               /* slow down performance, removing
*                               /* entries will speed up NATURAL ISPF

1 #ERROR-CODE(N3)
1 #ERROR-NR   (N4)
1 #ERROR-PARM(A75)
1 #OPTIONS    (A20)    /* I/O   for future use
*
* LOCAL
1 #I (N2)
* END-DEFINE
*
* Example: If in your environment, only department ids consisting of
* 2 characters are used for defining group profiles, you can
* reduce the number of array entries in the following way:
*   IN: FIAA068,FIAA06*,FIAA0*,FIAA*,FIA*,FI*,F*,*
*   OUT:FIAA068,FI*,*
*
* FOR #I = 1 TO 23
*   IF CHAIN-GROUPID(#I) = MASK (XX'') #USER-ID
*     CHAIN-GROUPID(2) := CHAIN-GROUPID(#I)
*     CHAIN-GROUPID(3) := ''
*     RESET CHAIN-GROUPID(4:23)
*     ESCAPE ROUTINE
*   END-IF
* END-FOR
*
* END

```

Node Exit ISP-NODU

This exit can be used to check whether access to a specific node is allowed. It is invoked whenever a user enters a Natural ISPF function or command, which needs access to an Entire System Server node.

By setting #ERROR-CODE and #ERROR-NUMBER access to a specific node can be disallowed. If the exit permits access to a specific node, this information is stored in Natural ISPF and the exit is not called any more with the same node ID.

To invoke the node exit, you must enter (NODE in the CONFIG member.

In addition to the standard data parameters described above, you must define the following data in the exit:

Parameter	Format	Type	Meaning
#NODE	(N3)	I	Node ID to be checked.

Example:

```

DEFINE DATA PARAMETER
  1 #NODE          (N3)          /* I      Node Id to be checked.
  1 #ERROR-CODE    (N3)
  1 #ERROR-NR      (N4)
  1 #ERROR-PARM    (A75)
  1 #OPTIONS       (A20)        /* I/O    for future use
END-DEFINE
*
* Restrict access to node 148
*
IF #NODE NE 148
  #ERROR-CODE := 1          /* set return code
  #ERROR-NR   := 9003       /* and message number
END-IF
END

```

HSM - Hierarchical Storage Manager Exit ISP-HSMU

This exit is invoked (if activated in CONFIG) whenever a migrated dataset has to be recalled before Natural ISPF recalls the dataset.

This exit can recall the dataset by submitting a batch job and inform the user to try again later. A special DELETE handling for migrated datasets can also be coded within this exit.

To invoke the HSM exit, you must enter either (HSM or (HSM-S in the CONFIG member:

- **(HSM)**
Setting the option (HSM in the CONFIG member causes the user exit to be invoked after the user has been prompted by Natural ISPF and has confirmed recall of the dataset.
- **(HSM-S)**
Setting the option (HSM-S activates the user exit in 'silent mode', that is, Natural ISPF's prompting is suppressed: the exit will be invoked without any prompting, whenever a user-initiated function refers to a migrated dataset. This option is useful when you want the user exit to set up its own customized prompting dialog.

In addition to the standard data parameters described above, you must define the following data in the exit:

Parameter	Format	Type	Meaning
ISPD---L		I	Contains session data including the field #DSNAME.
#RECALL-STATUS	(N1)	O	Possible options:
			0 Exit did not start RECALL. RECALL will be performed by caller.
			1 RECALL terminated successfully. Caller will continue processing.
			2 RECALL started but not yet terminated. Caller will abort processing and inform user to try again later.
			3 DELETE operation has been initiated or completed (valid only if #OPTIONS='FCT=DELETE'). Caller will abort processing and signal deletion with appropriate message.
			9 RECALL rejected by user or user exit. Makes sense mainly in 'silent mode', that is, with (HSM-S in CONFIG member. Caller will abort processing.
#OPTIONS	(A20)	I/O	<p>This field usually contains blanks. If it contains FCT=DELETE, this indicates that the exit is being invoked while handling a DELETE-DATASET command issued by the user. The exit can either ignore this information, or else it can set appropriate actions to delete the dataset from archive without recalling it. In the latter case, #RECALL-STATUS must be set to 3.</p> <p>Warning: At the time when the exit is invoked, Natural ISPF has not yet prompted for a confirmation of file deletion. If desired, this prompting has to be performed by the user exit.</p>

Example:

```

DEFINE DATA PARAMETER
    USING ISPD---L      /* Contains session data including
    PARAMETER           /* field #DSNAME
    1 #ERROR-CODE(N3)
    1 #ERROR-NR  (N4)
    1 #ERROR-PARM(A75)
    1 #RECALL-STATUS (N1)
    1 #OPTIONS    (A20)      /* I/O
END-DEFINE
*
RESET #RECALL-STATUS
END

```

Editor Profile Exit ISP-ED-U

When activated, this exit is invoked before an edit session is opened in Natural ISPF. The exit can change the list of profile names requested for this edit session.

To invoke this exit, you must enter (PROFIL in the CONFIG member.

In addition to the standard data parameters described above, you must define the following data in the exit:

Parameter	Format	Type	Meaning
#SES-DATA	(A200)	I	Session data for object.
#PROFILE-NAME	(A8/10)	I/O	Profile names.

Example:

```

DEFINE DATA PARAMETER
  * ***** ** *****
  1 #OBJECT      (A2)      /* I      Object type for the session
  1 #FUNCTION    (A2)      /* I      Function entered by user
  1 #SES-DATA    (A200)    /* I      Session data for object
  1 #PROFILE-NAME(A8/10) /* I/O     Profile names
END-DEFINE
*
END

```

Incore Database Defaults Exit IDB-USRN

This exit is invoked whenever the EDIT/BROWSE function is invoked in the Incore Database. It can be used to define application-specific defaults and return language-dependent data.

Before modifying the exit, copy it to the application library which uses the Incore Database, then make the changes and recompile it.

Parameter	Format	Type	Meaning
#LANGUAGE	(A1)	I/O	Requested language *
#DEFAULT-SCROLL	(A4)	O	Scroll value MOVE 'CSR' TO #DEFAULT-SCROLL
Language-dependent constants:			
#-ROW	(A4)	O	Row MOVE 'Row' TO #-ROW
#-OF	(A4)	O	Of MOVE 'of' TO #-OF
#-COMMAND	(A10)	O	Command MOVE 'COMMAND==>' TO #-COMMAND
#-SCROLL	(A9)	O	Scroll MOVE 'SCROLL==>' TO #-SCROLL
PF keys:			
#PF-KEY	(A50/24)	O	Contents ASSIGN #PF-KEY(1)=':I'
#PF-NAME	(A5/24)	O	Language dependent name ASSIGN #PF-NAME(1)='Insrt'

* Possible values for #LANGUAGE when used as an output parameter:

- The value '**H**' indicates that additional calls to Natural's text translation module NATPM are to be made to support inverted terminal display for Middle Eastern countries during the functions EDIT and BROWSE. When #LANGUAGE='H' is specified, the NATPM module must be specified as CSTATIC in your Natural parameter module.
- Any character other than **H** causes the screen to be displayed in the normal mode, without invoking the NATPM module.

Container File Access Exit IDBC---U

This exit is invoked whenever the Incore Database container file is accessed. It can be used to restrict access to the container file

Before modifying the exit, copy it to the application library which uses the Incore Database container file. You can then make the changes and recompile the exit.

Parameter	Format	Type	Meaning	
#ACTION	(A8)	I	Access type for incore file. Valid actions:	
			, ,	Directory from container.
			DELETE	Delete file from container.
			RETRIEVE	Read from container.
			STORE	Write to container.
#TYPE	(A8)	I	Identification of container file consists of the #TYPE, #GROUP and #NAME fields.	
#GROUP	(A48)	I		
#NAME	(A32)	I		
#ERROR-CODE	(N3)	O	Access denied if this field is anything but zero.	
#ERROR-TEXT	(A75)	O	Optional message text.	